

REMARKS

Claims 36, 39-41, 43-46, 49-50, 53, 57-58, and 60 are pending in the present application.

At the outset, Applicants wish to thank Examiner Morillo for the helpful and courteous discussion with their undersigned Representative on September 16, 2008. During this discussion the remarks and evidence set forth herein were discussed to address the outstanding rejections.

The currently claimed invention is represented by the independent claims currently pending - Claims 36 and 43 - which read as follows:

An optical information recording medium, comprising:  
a substrate and  
a first reflective layer on the substrate, wherein the first reflective layer comprises a silver base alloy; and wherein the silver base alloy of the first reflective layer consists of silver and 0.005 to 0.4 atom % of bismuth. (Claim 36)

\* \* \*

An optical information recording medium, comprising:  
a substrate and  
a first reflective layer on the substrate, wherein the first reflective layer comprises a  
silver base alloy;  
and wherein the silver base alloy of the first reflective layer  
consists of silver, 0.005 to 0.4 atom % of bismuth and 0.01 to 2 atom  
% in total amount of at least one rare earth metal element. (Claim 43)

The currently claimed invention differs from the cited art in that none of the cited references, independently or in combination, explicitly disclose or suggest the claimed optical information recording medium where the silver base alloy of the first reflective layer *consists of* either (a) silver and 0.005 to 0.4 atom % of bismuth (Claim 36 and claims dependent

therefrom) or (b) silver, 0.005 to 0.4 atom % of bismuth and 0.01 to 2 atom % in total amount of at least one rare earth metal element (Claim 43 and claims dependent therefrom). Further, none of the cited references, independently or in combination, provide a reasonable expectation of the criticality for the bismuth and/or rare earth metal content as claimed. Reconsideration of the remaining rejections is respectfully requested in view of the remarks and evidence set forth herein.

The rejection of Claims 36 and 39 under 35 U.S.C. §103(a) over JP 2001-184725 (JP ‘725) is respectfully traversed.

The Examiner alleges that JP ‘725 disclose an optical recording medium with a reflective silver alloy layer adhered to the substrate material. The Examiner further alleges that the silver alloy contains 0.5-5% total of one or more alloying elements, wherein one of said elements can be Bi, Cu, Au, and Pt (further includes Al, Co, Ni, Ti, V, Mo, Mn, Si, Nb, Fe, Ta, Hf, Ga, Pd, In, W, and Zr (see paragraph [0018])). It is the Examiner’s position that 0.5% is a close approximation of the presently claimed invention, which has a first reflective layer comprising a silver base alloy, which consists of silver and 0.005 to 0.4 atom % of bismuth.

The Examiner cites MPEP §2144.05 and alleges that “close enough” is “good enough”. While it may ordinarily be the case that the determination of optimum values for the parameters of a prior art process would be at least *prima facie* obvious, that conclusion depends upon what the prior art discloses with respect to those parameters. Where, the prior art disclosure suggests the outer limits of the range of suitable values, and that the optimum resides within that range, and where there are indications elsewhere that in fact the optimum

should be sought within that range, the determination of optimum values outside that range may not be obvious. (*In re Sebek*, 175 USPQ 93, 95 (CCPA 1972)).

In the present application, the questions are whether (1) JP '725 discloses an alloy of silver and bismuth, and (2) does JP '725 disclose a silver alloy with 0.005 to 0.4 atom % of bismuth.

With respect to the first question, Applicants submit that a silver alloy containing bismuth would appear as one of the 21 possible alloy combinations in paragraph [0018], but its selection is certainly not "obvious" as the disclosure of JP '725 embraces a silver alloy in combination with any combination of the 21 recited alloying elements. Therefore, the odds of selecting an alloy consisting of silver and bismuth would be calculated by the following equation:

$${}_nC_r = C(n,r) = n! / ( (n-r)! * r! )$$

Applying this equation to calculate the number of possible combinations of alloying elements would result in the odds of a silver-bismuth alloy being one in 2,097,151. Clearly, there would be no reasonable basis to conclude that the needle of an alloy of silver and bismuth would be selected from the haystack of over two million possible alloys. This is further emphasized by looking at the preferred embodiments of the Examples, none of which contain bismuth.

Even assuming, *arguendo*, that a silver-bismuth alloy is selected, there is absolutely no disclosure or reasonable suggestion of 0.005 to 0.4 atom % of bismuth content. Contrary to the Examiner's allegation that the content of 0.5 to 5% bismuth content is close enough to the claimed upper limit of 0.4%, JP '725 teaches away from the claimed concentration. The Examiner is referred to paragraph [0018] where JP '725 specifically states "In a case where  $0.005 \geq a$  [*i.e., less than 0.5%*], the corrosion resistance of the alloy reflective layer

comprising Ag as main ingredient is degraded remarkably.” (*emphasized text added to original*) The Examiner is reminded that MPEP §2141.02 states: “A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Accordingly, Applicants submit that the present invention is not obvious in view of JP ‘725.

Moreover, the JP ‘725 also fails to support a *prima facie* case of obviousness as this reference fails to appreciate the advantages flowing from the claimed invention. To illustrate the same, Applicants refer the Examiner’s attention to the Declaration under 37 C.F.R. §1.132 executed by Mr. Yuuki Tauchi submitted February 7, 2008 (“the Tauchi Declaration of 2/7/08”), which clearly shows the importance of the content of bismuth in the reflective layer. Specifically, Table 1 of the Tauchi Declaration of 2/7/08 is reproduced below:

Bi content in reflective layer [%]	Modulation [ratio]	PIE [count]	Electric property
0.08	0.66	143	GOOD
0.35	0.60	146	GOOD
0.52	0.49	469	NO GOOD
0.69	0.52	1159	NO GOOD

As illustrated in this Table, the upper limit of Bi content in the silver alloy reflective film for optical disk is set at 0.4 atomic percent. This upper limit is set due to observed decreases in modulation of recorded signal and increasing error signal in terms of decreasing thermal conductivity when the reflective film has more than 0.4% addition of Bi (see paragraph 8 of the Tauchi Declaration of 2/7/08). Applicants further refer to Graph 1 in the Declaration under 37 C.F.R. §1.132 executed by Dr. Junichi Nakai submitted February 7, 2008 (“the Nakai Declaration of 2/7/08”).

On page 9 of the Office Action mailed May 29, 2008, the Examiner “agrees that applicant has shown 0.08-0.35% Bi exhibits high modulation, low PIE, and “GOOD” electric property... with respect to  $\text{Bi} \geq 0.52\%$ .” The Examiner further “agrees that applicant has shown the criticality of 0.5% Bi as the maximum Bi desired.” However, the Examiner alleges that “applicant has not shown the criticality fully commensurate in scope with the instant claims (including the claimed minimum Bi).” As such, the Examiner suggests that Applicants provide at least one of:

- a) more evidence to be commensurate in scope/create a clear nexus between the evidence and the instant claims (i.e., the minimum Bi claimed and said evidence) and/or
- b) amend the instant claims to create said nexus between the evidence and the claim language, and/or
- c) submit an explanation of why the compositions covered by the instant claim language would be expected to behave in a manner consistent with the tested compositions. (see paragraph bridging pages 9-10 of the Office Action mailed May 29, 2008)

With the foregoing in mind, Applicants **submit herewith** a new Declaration under 37 C.F.R. §1.132 executed by Mr. Yuuki Tauchi (“the second Tauchi Declaration”), to demonstrate the criticality of the lower limit of Bi content of 0.005at%. First, Applicants direct the Examiner’s attention to Tables 5, 7, and 9 of the present application (Example 1-3) in which pure silver is directly compared to a silver alloy having a Bi content of 0.005at%. For the Examiner’s reference, the results of this comparison is reproduced below:

Table 5 - Results of durability (thermal stability)

Sample No.	Composition	Change in reflectance before and after high temperature high humidity test [%]		High durability
		wavelength 405nm	wavelength 650nm	
1	Pure Ag	-27.3	-3.0	×
2	Ag-0.005at% Bi alloy	-1.4	-0.8	○

Table 7 - Change in appearance after salt immersion test of Ag-based thin film

Sample No.	Composition	Change in appearance after salt immersion test	High durability
1	Pure Ag	Yes	×
2	Ag-0.005at% Bi alloy	No	○

Table 9 - Average roughness before and after high temperature high humidity test of Ag-based thin film

Sample No.	Composition	Average roughness before and after high temperature high humidity test [nm]		High durability
		Before test	After test	
1	Pure Ag	4.18	7.33	×
2	Ag-0.005at% Bi alloy	0.63	0.93	○

○: GOOD, ×: NO GOOD for each of Tables 5, 7, and 9

As described on page 67 of the present application, these data show that an Ag base alloy thin films satisfying the defined requirements of the present invention has high durability at the lower threshold concentration of Bi (sample No. 2), while with a thin film of the pure Ag (sample No. 1) it is not possible to obtain a prescribed high durability.

To further illustrate this difference, in the second Tauchi Declaration, the Declarant further explores the criticality of the lower claimed threshold concentration of Bi in

paragraph 6 described on pages 2-4. Applicants specifically direct the Examiner to Table 1 on page 3 of the second Tauchi Declaration reproduced below:

Table 1

Sample No.	Composition	Change in reflectance before and after high temperature high humidity test [%]		High durability
		wavelength 405nm	wavelength 650nm	
1	Ag-0.004at%Bi	-5.49	-1.42	×
2	Ag-0.010at%Bi	-3.32	-0.79	○
3	Ag-0.020at%Bi	-1.42	-0.08	○
4	Ag-0.055at%Bi	-1.12	0.09	○

○: GOOD, ×: NO GOOD

The Declarant summarizes these date on page 3 of the second Tauchi Declaration stating:

As is apparent from Table 1, any of the Ag base alloy thin films of the sample Nos. 2 to 4 satisfying the defined requirements of the present invention has high durability. In contrast, for the thin film of the sample No. 1, which contains less than the lower limit of Bi than defined in the present invention, it is not possible to obtain a prescribed high durability.

In addition to demonstrating the criticality of the lower claimed threshold concentration of Bi with respect to durability, the Declaration of the second Tauchi Declaration further provides, on pages 3-4, an evaluation of the chemical stability of the Ag base alloy thin films. The results are shown in Table 2, which is reproduced below.

Table 2

Sample No.	Composition	Change in appearance after salt solution immersion test	High durability
1	Ag-0.004at%Bi	Yes	×
2	Ag-0.010at%Bi	No	○
3	Ag-0.020at%Bi	No	○
4	Ag-0.055at%Bi	No	○

○: GOOD, ×: NO GOOD

The Declarant summarizes these date on page 4 of the second Tauchi Declaration stating:

“As apparent from Table 2, any of the Ag base alloy thin films of the sample Nos. 2 to 4 satisfying the defined requirements of the present invention has high durability. In contrast, for the thin film of the sample No. 1, which contains less than the lower limit of Bi than defined in the present invention, it is not possible to obtain a prescribed high durability.”

Applicants submit that the foregoing evidence clearly demonstrates the criticality of the criticality of the lower claimed threshold concentration of Bi. Further, when coupling this evidence with the Examiner’s recognized demonstration of criticality of the upper claimed threshold concentration of Bi would unequivocally demonstrate the invention of Claim 36 and the claims dependent therefrom are not obvious in view of the cited art and that any such alleged obviousness is rebutted by the foregoing evidence.

In view of the foregoing, Applicants submit that this ground of rejection is without merit and should be withdrawn. Confirmation to this effect is requested.

The rejection of Claims 40, 41, and 53 under 35 U.S.C. §103(a) over JP 2001-184725 (JP ‘725) in view of Nee ’603 (US 2002/0034603) or Worthington (US 2005/0018583) is respectfully traversed.

Claims 40, 41, and 53 depend from Claim 36. Claim 36 stands rejected under 35 U.S.C. §103(a) over JP ‘725. Applicants discuss JP ‘725 and the nonobviousness of Claim 36 above. Specifically, JP ‘725 fails to disclose or suggest the limitation relating to a first reflective layer on the substrate, wherein the first reflective layer comprises a silver base alloy; and wherein the silver base alloy of the first reflective layer consists of silver and *0.005 to 0.4 atom % of bismuth*.

Applicants submit that a careful review of Nee ’603 and Worthington show that neither of these references compensates for the deficiency discussed above with respect to JP ‘725 as neither of these references compensate for (a) the lack of a specific disclosure of silver-bismuth alloy as these references also do not disclose a silver-bismuth alloy, (b) the teaching away from the claimed concentration of bismuth, or (c) realize the advantages of the claimed invention. Accordingly, Applicants submit that the claimed invention is not obvious over the combined disclosures of JP ‘725, Nee ’603, and Worthington and that any such alleged obviousness is rebutted by the foregoing evidence.

Withdrawal of this ground of rejection is requested.

The rejection of Claims 43-46, 49, 50, 57, 58, and 60 under 35 U.S.C. §103(a) over JP 2001-184725 (JP '725) and Nee '603 (US 2002/0034603) or Worthington (US 2005/0018583) in view of Fuji et al (US 7,022,384) or JP 52-013688 (JP '688) or Nakai (US 6,689,444) or JP 2002-237097 is respectfully traversed.

Independent Claim 43 contains a limitation that the first reflective layer on the substrate within the claimed optical information recording medium comprises a silver base alloy that consists of silver, 0.005 to 0.4 atom % of bismuth and 0.01 to 2 atom % in total amount of at least one rare earth metal element.

The Examiner alleges that the claimed invention would be obvious in view of the cited references. Applicants disagree. JP '725, Nee '603, and Worthington are discussed above and fail to disclose or suggest a reflective layer containing an alloy of silver, bismuth, and a rare earth element, much less an alloy in which these elements are in the concentrations as claimed.

Indeed, as discussed above, JP '725 discloses a silver alloy in combination with any combination of 21 possible alloy combinations in paragraph [0018], but the selection of Bi is certainly not "obvious". As stated above, the odds of selecting an alloy consisting of silver and bismuth would be calculated by the following equation:

$${}_nC_r = C(n,r) = n! / ( (n-r)! * r! )$$

Applying this equation to calculate the number of possible combinations of alloying elements would result in the odds of a silver-bismuth alloy being one in 2,097,151. Clearly, there would be no reasonable basis to conclude that the needle of an alloy of silver and bismuth would be selected from the haystack of over two million possible alloys. This is further emphasized by looking at the preferred embodiments of the Examples, none of which contain bismuth.

Even if the artisan were to arrive at an alloy of silver and bismuth, JP ‘075 fails to provide any guidance to further include a rare earth metal element with the silver and bismuth. Even further, JP ‘075 offers no disclosure or suggestion of the specifically claimed concentrations of bismuth and/or the rare earth metal elements.

The Examiner alleges that JP ‘097, JP ‘688, Fuji and Nakai compensate for the first deficiency in that they disclose the addition of rare earth elements to improved wear resistance/durability. Applicants again submit that JP ‘275 specifically limits the concentration of bismuth and effectively teaches away from reducing the concentration of bismuth to the range as claimed. Moreover, Applicants note that neither Fuji nor Nakai disclose or suggest a silver-bismuth alloy or the possibility of adding a rare earth element to a silver-bismuth alloy. Accordingly, the Examiner’s reliance upon these references is misplaced.

Applicants submit that, contrary to the Examiner allegations, none of Nee ‘603, Worthington, JP ‘097, JP ‘688, Fuji, and Nakai compensate for the deficiency in JP ‘725 as JP ‘725 clearly teaches away from the claimed invention and fails to provide any disclosure of the advantages flowing from the concentration of bismuth in the silver-based alloy as illustrated in the Tauchi Declaration of 2/7/08, the Nakai Declaration of 2/7/08, and the second Tauchi Declaration as discussed above.

To further illustrate the effectiveness of the claimed silver alloy containing silver, bismuth, and a rare earth metal element (e.g., Nd), Applicants refer the Examiner to paragraphs 7-9 of the second Tauchi Declaration on pages 4-6. Particular reference is made to Table 3 reproduced below:

Table 3 shows PI of manufactured disks.

Bi content (at%)	Nd content(at%)	PIE [count]	Electric property
0	0	172	GOOD
0.02	0	48	GOOD
0.049	0	66	GOOD
0.05	0.2	111	GOOD
0.07	0.7	57	GOOD

The Declarant summarizes these date on page 6 of the second Tauchi Declaration stating:

“PI error (PI sum 8) should be 280 or less was established by Standard so that data of PI [*sic*] error of 280 or less was evaluated as GOOD. PI error has been maintained under 280 when the Bi content is near lower limit, 0.005at%. PI error also has been maintained under 280 when the Nd is further contained. Accordingly, it is proper that Bi contents of film should be 0.005 at% to 0.4 at% when the film will be used as reflective layer of DVD+R Disk. Further, it is proper that Nd is further contained.”

Further, to demonstrate that the beneficial properties of the optical information recording medium of Claim 43 (and the claims dependent therefrom) extends beyond just Nd as a rare earth metal element, the Examiner’s attention is directed to Tables 5, 7, and 9 of the present application, which are reproduced, in part, below:

Table 5 - Results of durability (thermal stability)

Sample No.	Composition	Change in reflectance before and after high temperature high humidity test [%]		High durability
		wavelength 405nm	wavelength 650nm	
1	Pure Ag	-27.3	-3.0	×
2	Ag-0.005at% Bi alloy	-1.4	-0.8	○
10	Ag-0.2at% Bi-0.01at% Nd alloy	-0.6	-0.2	○
11	Ag-0.2at% Bi-0.1at% Nd alloy	-0.5	-0.1	○
12	Ag-0.2at% Bi-0.5at% Nd alloy	-0.3	-0.1	○
13	Ag-0.2at% Bi-2at% Nd alloy	0.0	0.0	○
14	Ag-0.2at% Bi-3at% Nd alloy	0.0	0.0	○
15	Ag-0.2at% Bi-0.01at% Y alloy	-0.6	-0.2	○
16	Ag-0.2at% Bi-0.1at% Y alloy	-0.5	-0.1	○
17	Ag-0.2at% Bi-0.5at% Y alloy	-0.4	-0.1	○
18	Ag-0.2at% Bi-2at% Y alloy	0.0	0.0	○
19	Ag-0.2at% Bi-3at% Y alloy	0.0	0.0	○

Table 7 - change in appearance after salt immersion test of Ag-based thin film

Sample No.	Composition	Change in appearance after salt immersion test	High durability
1	Pure Ag	Yes	×
2	Ag-0.005at% Bi alloy	No	○
10	Ag-0.2at% Bi-0.01at% Nd alloy	No	○
11	Ag-0.2at% Bi-0.1at% Nd alloy	No	○
12	Ag-0.2at% Bi-0.5at% Nd alloy	No	○
13	Ag-0.2at% Bi-2at% Nd alloy	No	○
14	Ag-0.2at% Bi-3at% Nd alloy	No	○
15	Ag-0.2at% Bi-0.01at% Y alloy	No	○
16	Ag-0.2at% Bi-0.1at% Y alloy	No	○
17	Ag-0.2at% Bi-0.5at% Y alloy	No	○
18	Ag-0.2at% Bi-2at% Y alloy	No	○
19	Ag-0.2at% Bi-3at% Y alloy	No	○

Table 9 - Average roughness before and after high temperature high humidity test of Ag-based thin film

Sample No.	Composition	Average roughness before and after high temperature high humidity test [nm]		High durability
		Before test	After test	
1	Pure Ag	4.18	7.33	×
2	Ag-0.005at% Bi alloy	0.63	0.93	○
10	Ag-0.2at% Bi-0.01at% Nd alloy	0.58	0.60	○
11	Ag-0.2at% Bi-0.1at% Nd alloy	0.55	0.59	○
12	Ag-0.2at% Bi-0.5at% Nd alloy	0.52	0.56	○
13	Ag-0.2at% Bi-2at% Nd alloy	0.45	0.48	○
14	Ag-0.2at% Bi-3at% Nd alloy	0.44	0.48	○
15	Ag-0.2at% Bi-0.01at% Y alloy	0.57	0.60	○
16	Ag-0.2at% Bi-0.1at% Y alloy	0.56	0.59	○
17	Ag-0.2at% Bi-0.5at% Y alloy	0.53	0.58	○
18	Ag-0.2at% Bi-2at% Y alloy	0.47	0.53	○
19	Ag-0.2at% Bi-3at% Y alloy	0.45	0.52	○

○: GOOD, ×: NO GOOD for each of Tables 5, 7, and 9

As described on page 67 of the present application, these data show that an Ag base alloy thin films having bismuth and a rare earth metal element satisfying the defined requirements of the present invention has high durability, while with a thin film of the pure Ag (sample No. 1) it is not possible to obtain a prescribed high durability.

In view of the foregoing, Applicants request withdrawal of this ground of rejection.

The rejection of Claims 43-46, 49, 50, 57, 58, and 60 under 35 U.S.C. §103(a) over JP 52-013688 (JP '688) and Nee '603 (US 2002/0034603) or Worthington (US 2005/0018583) is respectfully traversed.

The Examiner cites JP '688 as allegedly disclosing an "alloy consisting of 0.1-3% Bi 0.2-4% RE, balance Ag" and states that JP '688 "does not teach the first reflective Ag-Bi

layer is a semi-transmissive film with a second layer on said substrate of a reflective Ag-Bi alloy.” Based on these allegations it appears that the Examiner’s rejection is not over the English abstract, which is the only English language text from JP ‘688 that is of record, but rather is over the underlying disclosure.

Applicants submit that this rejection is improper and not supported by the record. The Examiner is reminded that Applicants are entitled to request that the Examiner provide a full English-language translation of a reference that the Examiner cites in support of a rejection (see pages 1684 of the attached copy of Ex parte Gavin, 62 USPQ2d 1680 (2001)). Specifically, the Board states: “In the event a reference is in a foreign language, if the applicant does not wish to expend resources to obtain a translation, the applicant may wish to request the examiner to supply a translation.” The Board further states: “...obtaining translations is the responsibility of the examiner.” Accordingly, under Gavin, Applicants are respectfully requesting the full English-language translations of JP 60-123416, JP 3-111530, JP 2000-44476, JP 62-240612, and JP 05-112423.

Based on the record available (i.e., the English Abstract of JP ‘688) Applicants submit that JP ‘688 fails to provide any disclosure or suggestion of the amount of bismuth and/or rare earth elements to be used in the silver-based alloy. Further, JP ‘688 fails to disclose or suggest that the alloy is to only contain silver, bismuth, and one or more rare earth elements. Moreover, JP ‘688 fails to disclose or suggest that such an alloy is used in a first reflective layer on a substrate for use in an optical information recording medium.

Applicants submit that Nee ’603 and Worthington fail to compensate for deficiencies as neither of these references disclose a silver-based alloy containing bismuth and one or more rare earth elements, much less in the claimed concentrations. Therefore, without addressing the Examiner’s specific allegations with respect to the application of Nee ’603 and

Worthington, Applicants submit that the claimed invention is not obvious in view of English Abstract of JP '688 when combined with either of the disclosures of Nee '603 and Worthington.

To further illustrate the effectiveness of using the claimed silver alloy containing silver, bismuth, and a rare earth metal element (e.g., Nd), Applicants refer the Examiner to paragraphs 7-9 of the second Tauchi Declaration on pages 4-6 (see Table 3 therein) and to Tables 5, 7, and 9 of the specification. Rather than reproducing the arguments above, Applicants refer the Examiner to the summary of the results demonstrated by paragraphs 7-9 of the second Tauchi Declaration on pages 4-6 (see Table 3 therein) and to Tables 5, 7, and 9 of the specification above.

Applicants submit that when the evidence of record is further taken into account, the claimed invention is not obvious over the English Abstract of JP '688 when combined with either of the disclosures of Nee '603 and Worthington.

Withdrawal of this ground of rejection is requested.

Finally, Applicants respectfully request that the obviousness-type double patenting rejections over co-pending application 11/353,168 and application 10/844,345 be held in abeyance until an indication of allowable subject matter in the present application. If necessary, a terminal disclaimer will be filed at that time. Until such a time, Applicants make no statement with respect to the propriety of this ground of rejection.

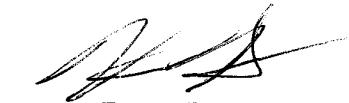
However, the Examiner is reminded that MPEP §804 indicates that: "If "provisional" ODP rejections in two applications are the only rejections remaining in those applications, the examiner should withdraw the ODP rejection in the earlier filed application thereby permitting that application to issue without need of a terminal disclaimer." The present

application is the earlier filed application and, therefore, if this application is in condition for allowance prior to application 11/353,168 and application 10/844,345, the obviousness-type double patenting rejection should be withdrawn.

Accordingly, this application is now in condition for allowance, and early notification thereof is earnestly solicited.

Respectfully submitted,

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